

DOCUMENT RESUME

ED 169 363

CE 020 548

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TITLE Agriculture--Soil Conservation. Kit No. 74.
Instructor's Manual [and] Student Learning Activity Guide.
INSTITUTION Clemson Univ., S.C. Vocational Education Media Center.; South Carolina State Dept. of Education, Columbia. Office of Vocational Education.
SPONS AGENCY Office of Education (DHEW), Washington, D.C.
PUB DATE 78
GRANT SC-5058-76-I-211-0330
NOTE 26p.; For related documents see CE 020 474-566
AVAILABLE FROM Vocational Education Media Center, 10 Tillman Hall, Clemson University, Clemson, South Carolina 29631 (complete set of modules, 14 filmstrips and cassettes, \$260.00; set of 87 student modules, \$42.50)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Agriculture; Behavioral Objectives; *Instructional Materials; *Learning Activities; *Learning Modules; Occupational Clusters; *Occupational Information; Prevocational Education; *Soil Conservation

ABSTRACT

An instructor's manual and student activity guide on soil conservation are provided in this set of prevocational education materials which focuses on the vocational area of agriculture. (This set of materials is one of ninety-two prevocational education sets arranged around a cluster of seven vocational offerings: agriculture, home economics, distributive education, health occupations, world of work, trade and industry, and office occupations.) The instructor's guide is organized into the following elements: title of activity, duration of activity (four to seven periods), activity goals, seven instructional objectives, related vocational clusters, and activity implementation (description, materials needed, safety considerations, teacher preparation prior to class, during the class, follow-up activities, answer key to student check point activities, and masters for duplication). The student activity guide provides step-by-step instructions (narrative and illustrations) for completing each instructional objective. At the end of each set of instructions is a student check point (evaluation activity). Occupational descriptions for a laboratory tester, county-agricultural agent, and extension service specialist conclude the document. (JH)

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ED169363

AGRICULTURE — SOIL CONSERVATION

Kit No. 74

INSTRUCTOR'S MANUAL

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Office of Vocational Education
Prevocational Education
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In Cooperation With

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1978

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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Department of Health, Education and Welfare, Office of Education.*

TITLE OF ACTIVITY

Kit No. 74, Agriculture — Soil Conservation

DURATION

Main Activity: 3 — 4 periods

Follow-up Activity: 1 — 3 periods

GOALS

Through observation, the students will be able to tell how ground cover helps protect the soil from erosion; how coarse soils (sandy soils) percolate water faster than clay soils and also dry faster and erode less; and finally, how contour plowing reduces erosion on the same type of soil and slope.

INSTRUCTIONAL OBJECTIVES

Given directions by the instructor, each student will be assigned a group number. These numbers designate soil sample areas where students will be working.

Students in Group 1 will obtain a sod sample for their soil experiment.

Groups 2, 3, 4, 5, and 6 will obtain all necessary tools and equipment and fill their trays with the appropriate soil.

Each group will arrange its sample for experimentation.

Using answer sheet 5, each student will identify five forms of erosion.

Every student will identify the erosion characteristics of six types of soil samples.

Each student will discuss the importance of soil conditions and crop production.

VOCATIONAL CLUSTERS

Trade and Industry
Health Occupations

ACTIVITY IMPLEMENTATION

A. Description

This activity will be done in groups;

however, individual tasks may be assigned within the group.

B. Safety

The classroom floor must be kept free of spilled soil and/or water to prevent students from slipping. Keep a mop and bucket, broom, dustpan and paper towels within easy reach.

C. Materials

1. Audio Visual Equipment
None
2. Technical Equipment
6 Tray pans
6 Soil sample trays
2 One gallon water sprinklers (1 gallon = 3.79 l)
6 One gallon containers (1 gallon = 3.79 l)
6 Garden trowels
1 Spade
1 Pair scissors
5 Soil sample containers
1 — sand
1 — clay
3 — sandy loam
3. Expendable Materials
Paper towels
Soil Samples
20 lbs. (9.1 kg) sandy soil
15 lbs. (6.8 kg) loam soil
5 lbs. (2.3 kg) clay soil
1 sod sample

D. Preparation Prior to Class

Select an area outside which has a good grass cover and could be dug up as a sod sample 14" x 20" (35.6 x 50.8 cm).

Rearrange classroom if necessary to accommodate three tables large enough for two sample trays and pans each. Leave viewing area around the tables.

Obtain a broom, dustpan, mop, bucket, and paper towels from the custodian. Locate the best place to obtain water to fill the water sprinklers and also a good place to empty the catch containers.

Clean up after the experiments are completed.

Duplicate all masters from the manual.

E. During Class Session

INTRODUCTION — In the world of work there is a need for people who have a knowledge of soil conservation practices. Whether you want to be a farmer, gardener, forester, groundskeeper or are just interested in your own yard, the experiments you will perform in the next several class sessions will demonstrate some of the facts you should know about soil conservation.

The class will be divided into groups. Each group will perform an experiment on a given sod or soil sample to illustrate the basics of soil conservation.

TO THE TEACHER: Give one copy of the Student Activity Learning Guide to each student. Divide the class into 6 groups as explained in Objective I. Proceed with the activity as outlined in the Student Activity Guide.

Let each group be responsible for keeping its area clean.

When sprinkling water on the sample trays, there can be two students sprinkling at the same time.

F. Follow-up Activities

Have each student complete a VIEW Fact Sheet.

Have as many of the following people as can be arranged talk to the class about soil conservation:

1. County Agent
2. Official from Soil and Water Conservation Service
3. Forester
4. Farmer
5. Agriculture Teacher

Depending on the transportation available and the school location, if possible take a field trip during one class after a heavy rain. The students will then be able to see first hand the results of good and bad soil conservation practices. Look at some farmer's fields; see how muddy some streams are; and notice how water stands in some fields and not in others.

ANSWER KEY

Objective V

1. weathering
2. corrosion
3. abrasion
4. dissolution
5. transportation

MASTERS FOR DUPLICATION

VIEW Fact Sheet
Group Cards for Objective I
Answer Sheets 5 & 6

VIEW FACT SHEET

NAME _____ CLASS _____ OCCUPATION _____

- A. List the advantages (good points) of this occupation (job).
- B. List the disadvantages (bad points) of this occupation (job).
- C. List three things you should know to do this occupation (job).
1.
2.
3.
- D. What type of education should you get to be prepared (do) for this occupation (job)?
- E. What courses must you take to go into this occupation (job)?
- F. What do you think your future in this occupation (job) will be?
- G. What wage can you expect in this occupation (job)?
- H. What are the working hours of this occupation (job)?
- I. To learn more about this occupation (job), write to:
- J. Using a scale of 1 to 5, circle the number that measures your interest in this occupation (job) as a possible career.

I don't like it. 1 2 3 4 5 I like it.

3 6

GROUP CARDS

Group I – Sod Sample	Group II – Sandy Loam Soil Sample
Group III – Sand Soil Sample	Group IV – Clay Soil Sample
Group V – Sandy Loam Soil Sample	Group VI – Sandy Loam Soil Sample

ANSWER SHEET V

1. _____
2. _____
3. _____
4. _____
5. _____

ANSWER SHEET VI

SOIL SAMPLEEROSION EFFECT

Tray 1	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged
Tray 2	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged
Tray 3	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged
Tray 4	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged
Tray 5	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged

Answer Sheet VI (cont'd.)

SOIL SAMPLE

EROSION EFFECT

Tray 6	runoff in catch container	less 1/2 can more 1/2 can
	runoff through soil on tray	less 1/2 can more 1/2 can
	condition of soil	changed unchanged

AGRICULTURE – SOIL CONSERVATION

Kit No. 74

**STUDENT
LEARNING ACTIVITY GUIDE**

Prepared by

**Barron Simms
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SOIL CONSERVATION

INTRODUCTION

After a heavy rain have you ever noticed that many streams are very muddy, while others are not? Have you seen farmers working in some fields a short time after a rain, while other fields remain unworked for long periods? Have you seen some cultivated fields that are terribly eroded, while others seem hardly changed after heavy rains?

In this activity you will be able to understand the reasons for erosion problems through your own activities and observations.

You will fill sample trays with either sod or soil samples. By pouring water from sprinklers you will be able to observe the results of running water on sod and soil.

GOALS

Through observation, the students will be able to tell how ground cover helps to protect soil from erosion; how coarse soils (sandy soils) percolate water faster than clay soils and also dry faster and erode less; and finally, how contour plowing reduces erosion on the same type of soil and slope.

DIRECTIONS

Read and follow each step as your teacher directs you. Be sure you complete each step before going to the next. Make sure you have met the requirements of each checkpoint before continuing.

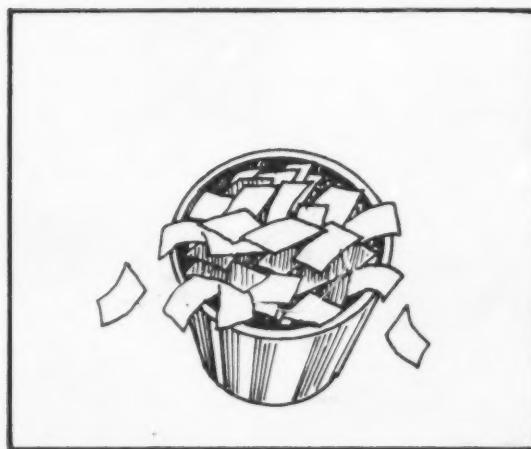
MATERIAL

- 6 tray pans
- 6 soil sample trays
- 2 one gallon water sprinklers (1 gallon = 3.79 l)
- 6 one gallon containers (1 gallon = 3.79 l)
- 6 garden trowels
- 1 spade
- 1 pair scissors
- 5 soil samples in containers
 - 1 sand
 - 1 clay
 - 3 sandy loam

PROGRAMMED TEXT

Instructional Objective 1

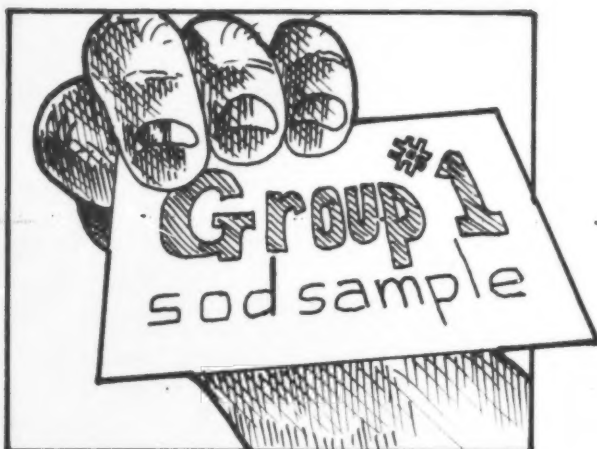
Given directions by the instructor, each student will be assigned a group number. These numbers designate soil sample areas where students will be working.



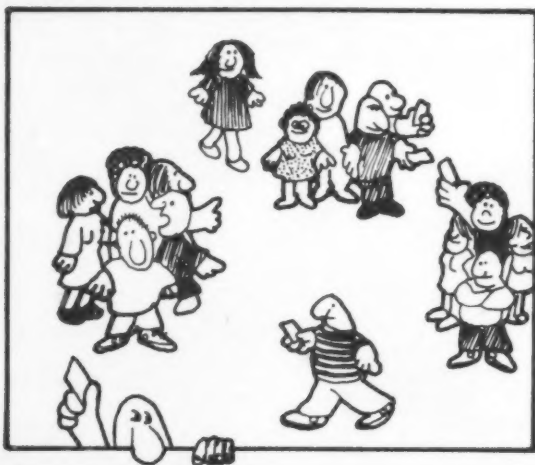
STEP 1 — Your instructor will have a container of area cards.



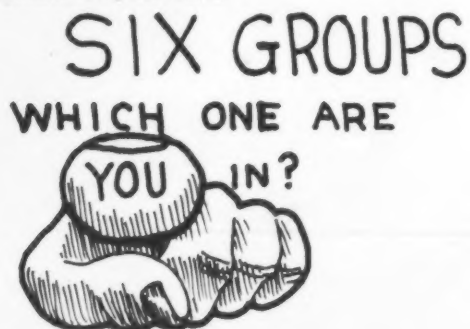
STEP 2 — When directed by your instructor, select a card.



STEP 3 — The group number and soil type is identified on this card.



STEP 4 — Assemble in groups according to the number of your card.

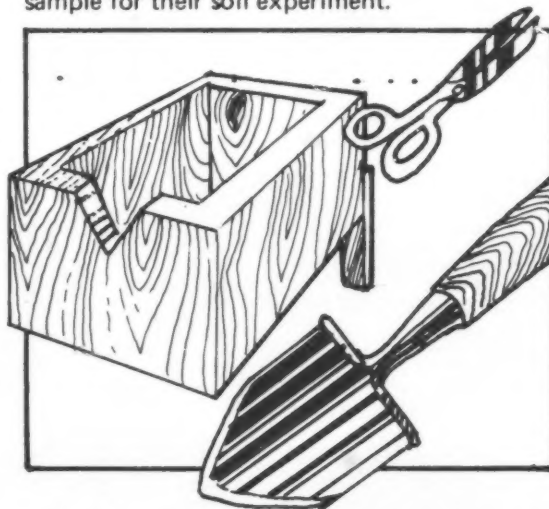


STEP 5 — The six groups in each class are:

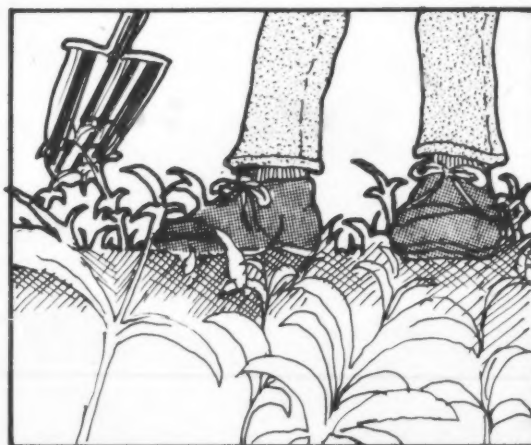
- Group I — Sod sample
- Group II — Sandy Loam Soil Sample
- Group III — Sand Soil Sample
- Group IV — Clay Soil Sample
- Group V — Sandy Loam Soil Sample
- Group VI — Sandy Loam Soil Sample

Instructional Objective II

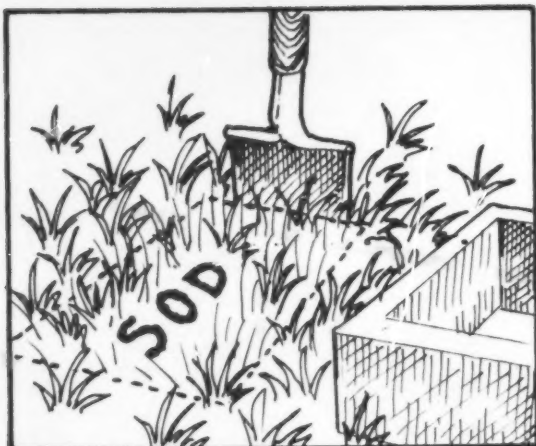
Students in Group I will obtain a sod sample for their soil experiment.



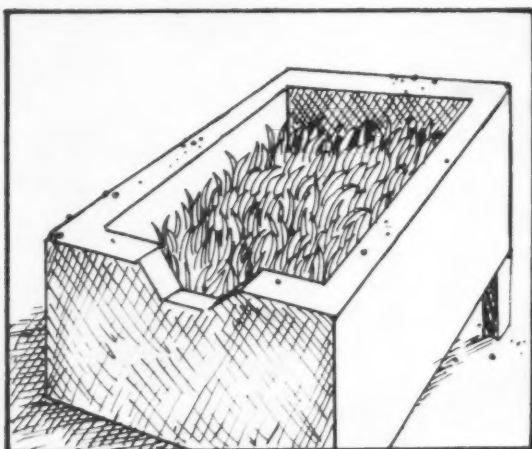
STEP 1 — The group will obtain a soil sample tray, spade and scissors.



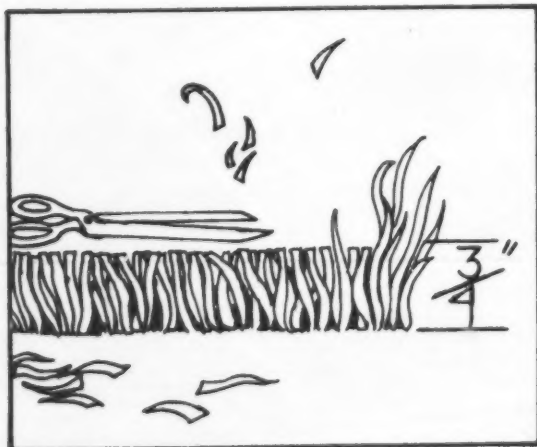
STEP 2 — Proceed to a grassy area designated by your instructor.



STEP 3 — Using the spade, dig a sod sample the same size as the tray.



STEP 4 — Place the sod sample in the tray.



STEP 5 — Using the scissors, cut all grass to a uniform height of about $\frac{3}{4}$ " (1.91 cm).



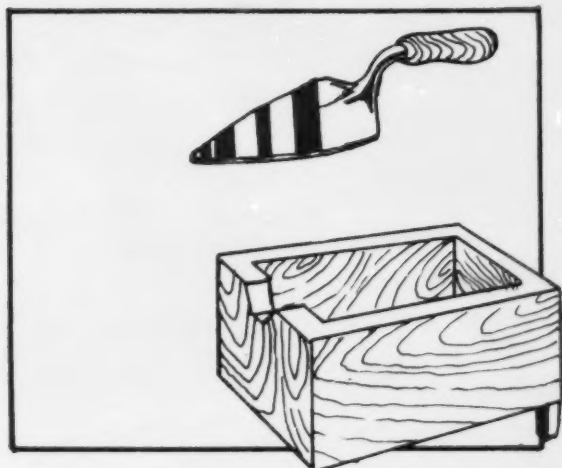
STEP 6 — Return to the classroom with all the tools and material.

Check Point

Have your instructor inspect your completed tray.

Instructional Objective

Groups 2, 3, 4, 5, and 6 will obtain all necessary tools and equipment and fill their trays with the appropriate soil.



STEP 1 — Groups 2, 3, 4, 5, and 6 will obtain a soil sample tray and a trowel.



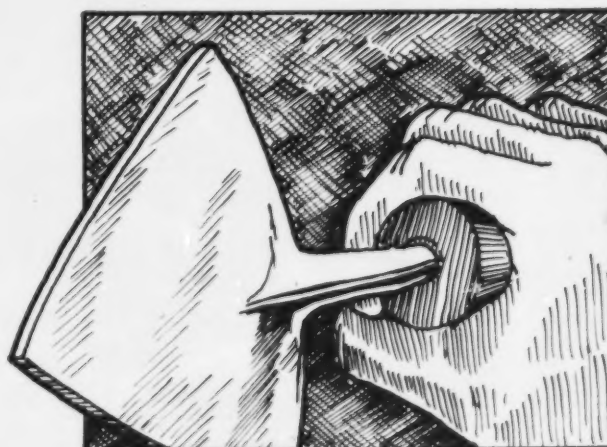
STEP 2 — Groups 2, 5, and 6 will fill their trays with sandy loam soil.



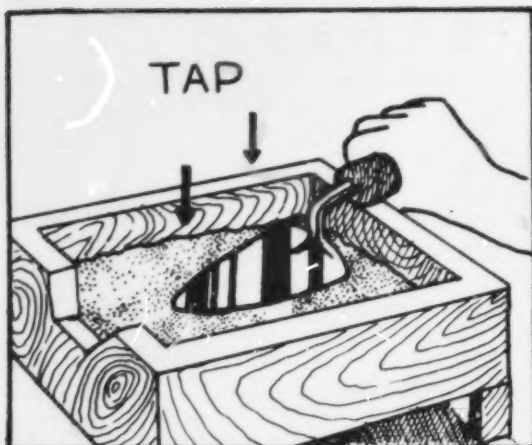
STEP 3 — Group 3 will fill its tray with a sand soil sample.



STEP 4 — Group 4 will fill its tray with a clay soil sample.



STEP 5 — Each group will use a trowel to fill the trays.



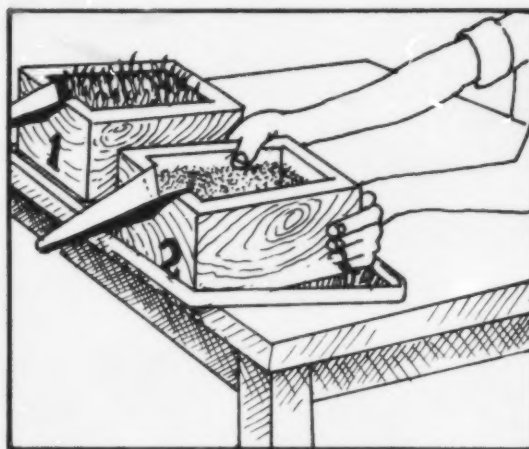
STEP 6 — Gently tap the sample with the trowel to compress (pack) the soil in the tray.

Check Point

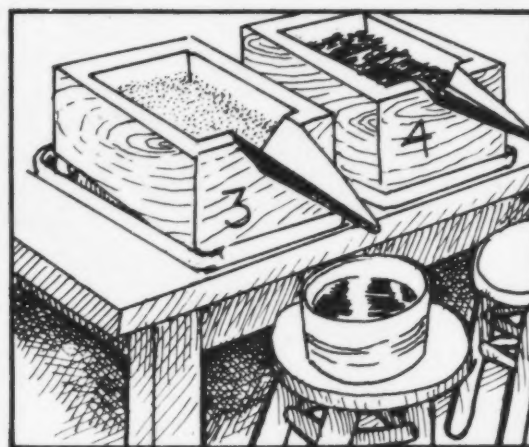
Is your tray filled with the correct type of soil sample?

Instructional Objective IV

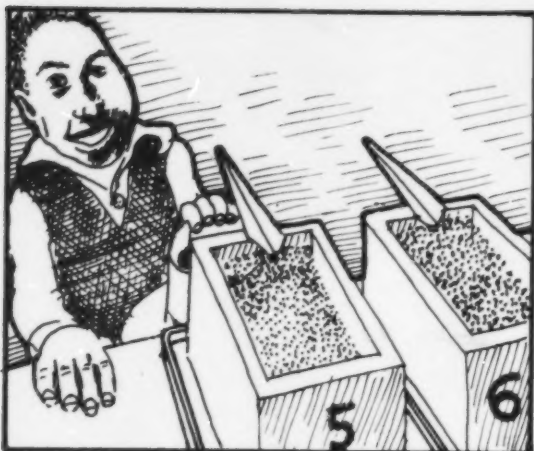
Each group will arrange its sample for experimentation.



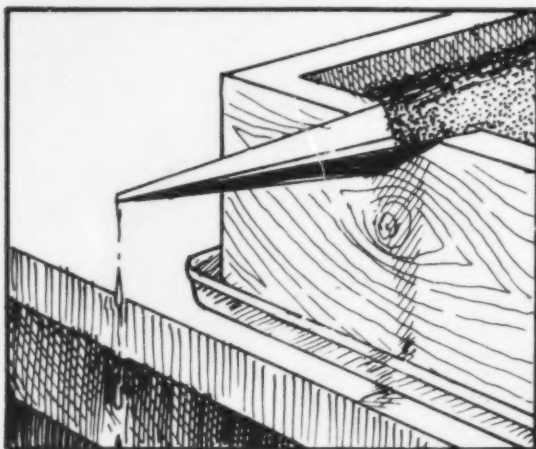
STEP 1 — On one tabletop locate trays and pans numbers 1 and 2.



STEP 2 — On a second tabletop place trays and pans numbers 3 and 4.



STEP 3 — On a third tabletop place trays and pans numbers 5 and 6.



STEP 4 — Place every tray so that the drain spout extends over the edge of the tabletop.



STEP 5 — Use a chair or stool to place a gallon (3.79 l) container below each spout.

Check Point

Are the tables arranged as follows?

1st table: Sod Sample and Sandy Loam Sample

2nd table: Sand Soil Sample and Clay Soil Sample

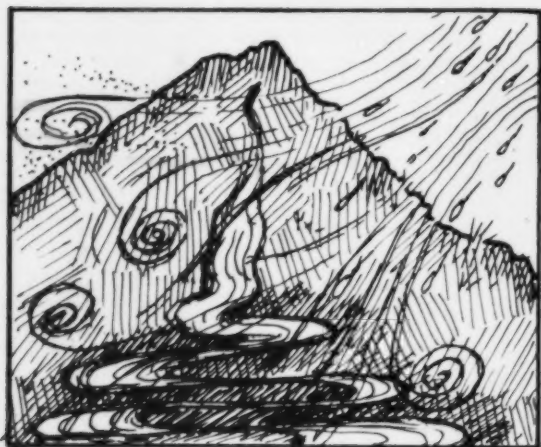
3rd table: Two Sandy Loam Soil Samples

Instructional Objective V

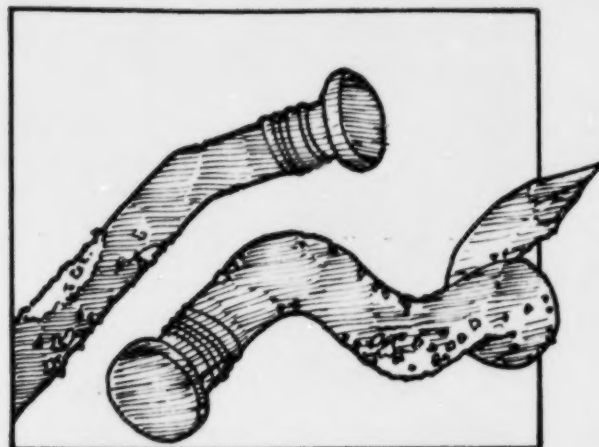
Using Answer Sheet 5, each student will identify five forms of erosion.



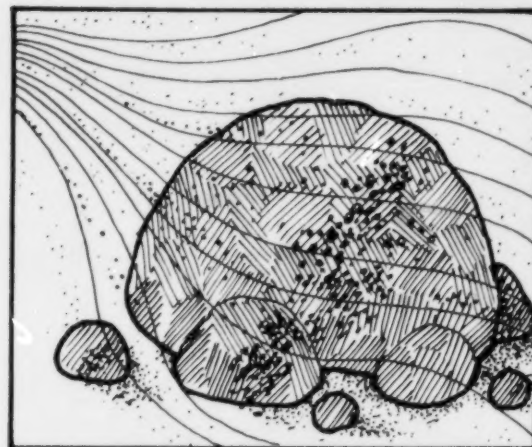
STEP 1 — The process of erosion occurs through both natural activities and those caused by people.



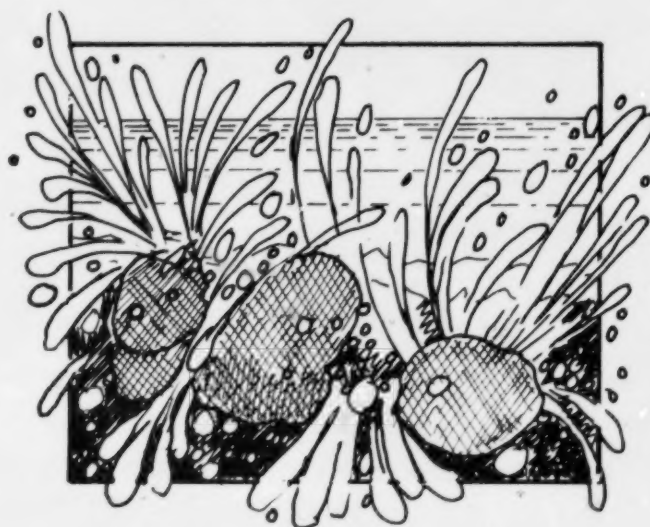
STEP 2 — Some natural activities include weathering,



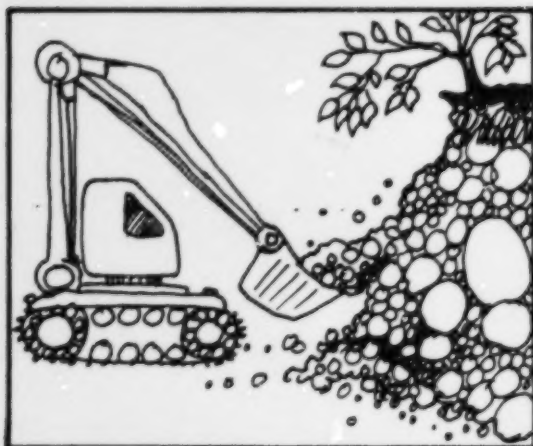
STEP 3 — corrosion,



STEP 4 — abrasion,



STEP 5 — and dissolution.



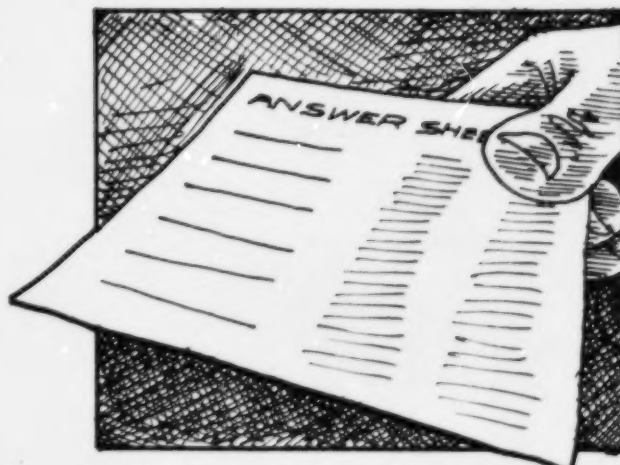
STEP 6 – Mining is an example of human activity which causes erosion through transportation of soil from one place to another.

Check Point

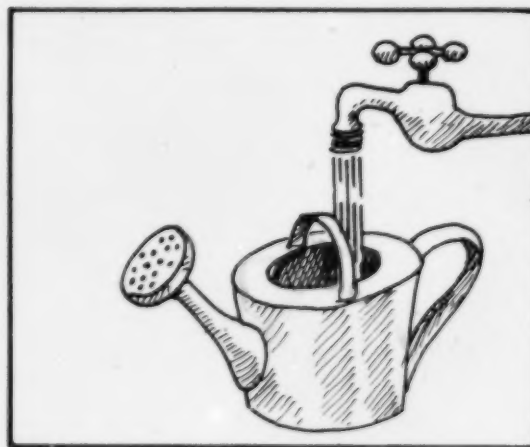
Using Answer Sheet 5, list five forms of erosion.

Instructional Objective VI

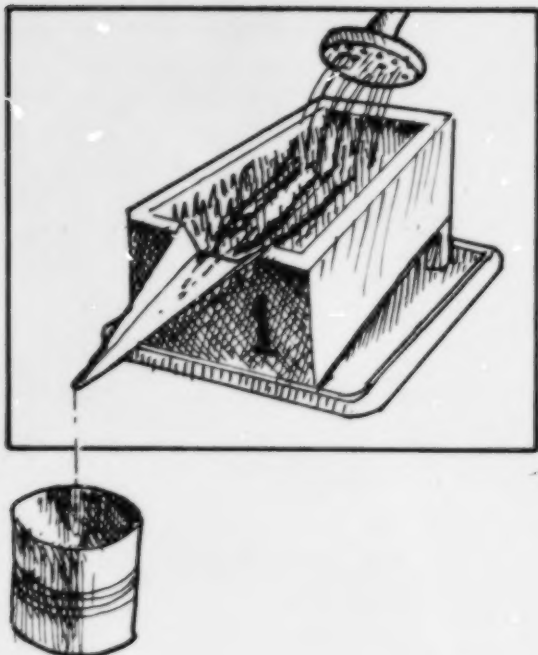
Every student will identify the erosion characteristics of six types of soil samples.



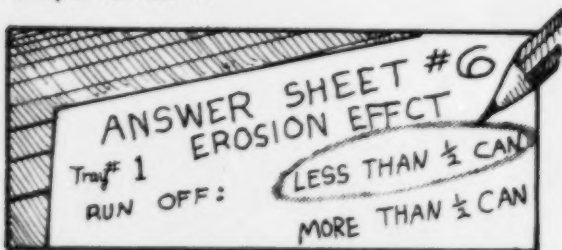
STEP 1 – Using Answer Sheet 6, identify what happens when water is sprinkled over each tray.



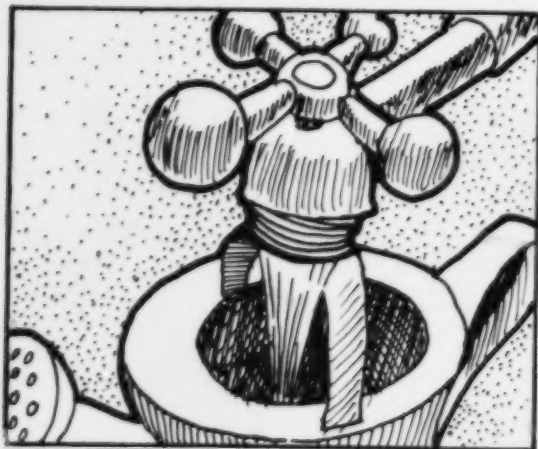
STEP 2 – Fill a water sprinkler with water.



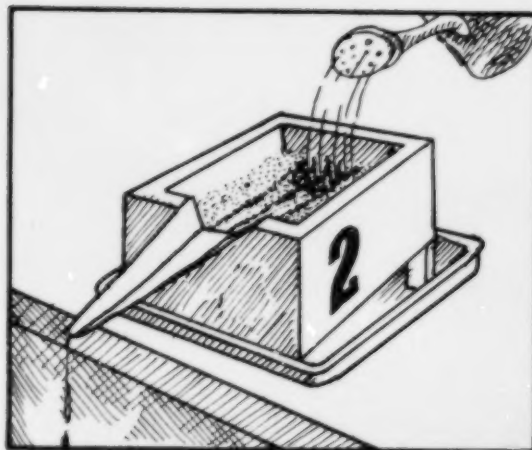
STEP 3 — Sprinkle all the water on soil sample number 1.



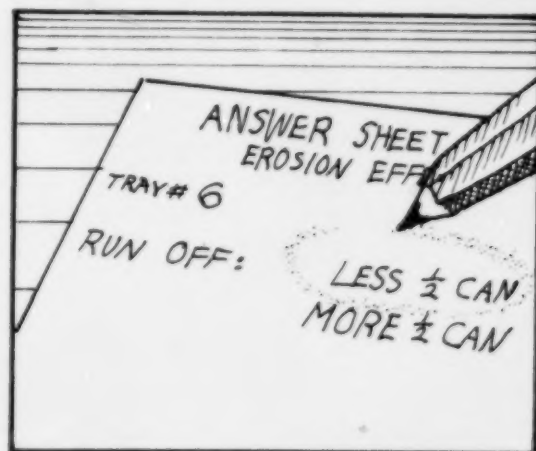
STEP 4 — Circle the results on your Answer Sheet.



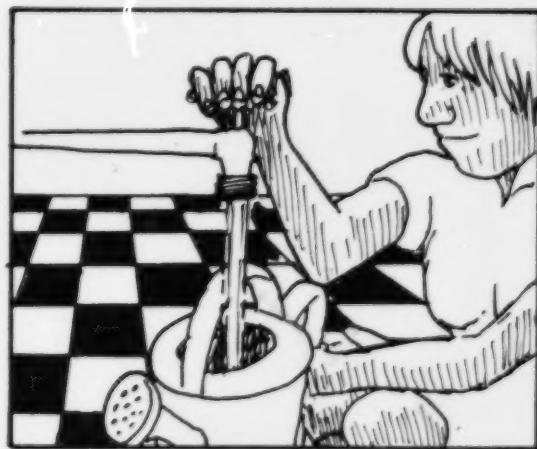
STEP 5 — Refill the water sprinkler.



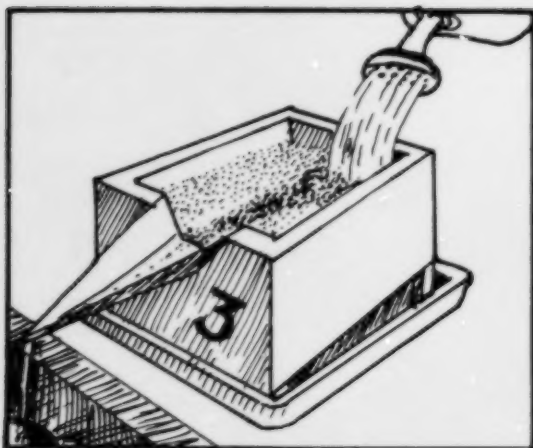
STEP 6 — Sprinkle all the water on soil sample number 2.



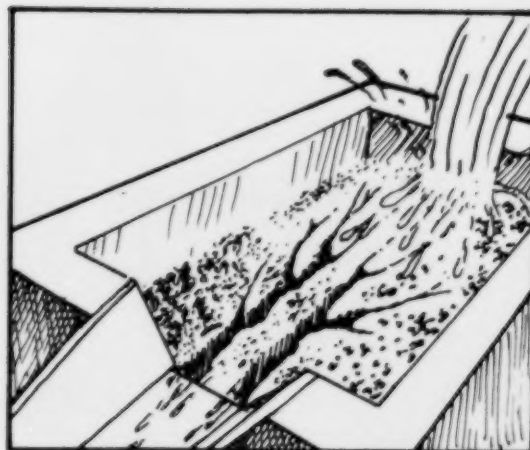
STEP 7 — Record the results on your Answer Sheet.



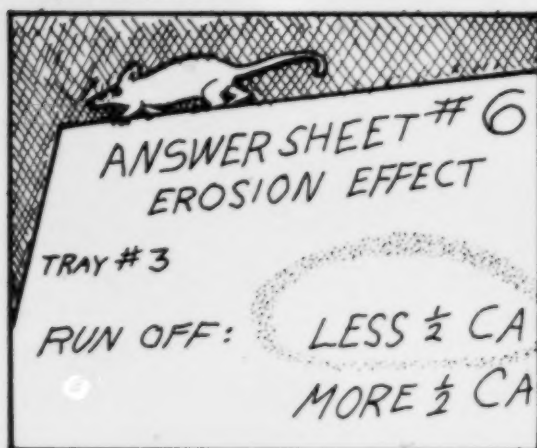
STEP 8 — Refill the water sprinkler.



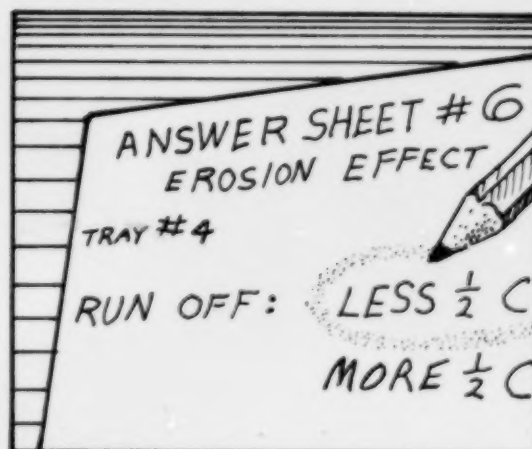
STEP 9 — Sprinkle all the water on soil sample number 3.



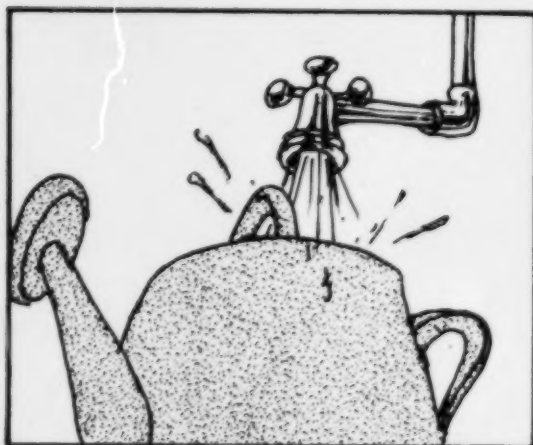
STEP 12 — Sprinkle all the water on soil sample number 4.



STEP 10 — Record the results on your Answer Sheet.



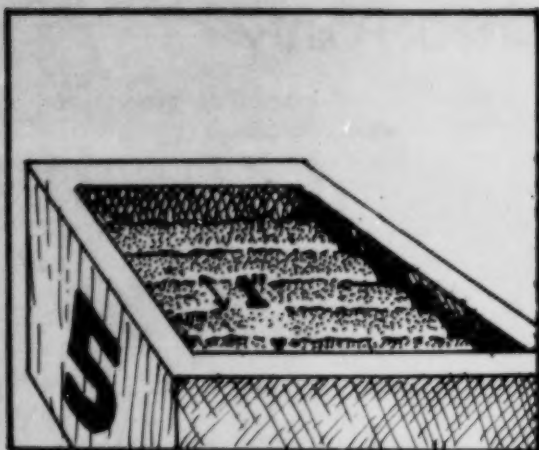
STEP 13 — Record the results on your Answer Sheet.



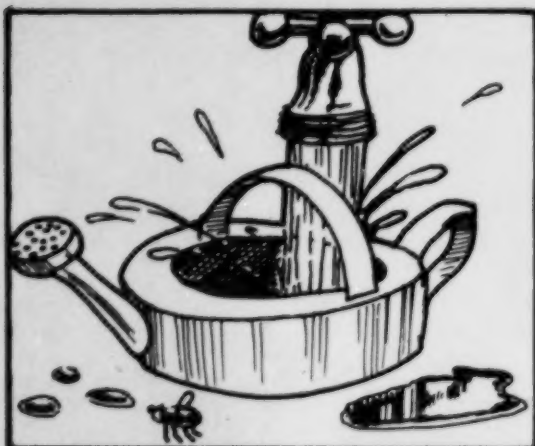
STEP 11 — Refill the water sprinkler.



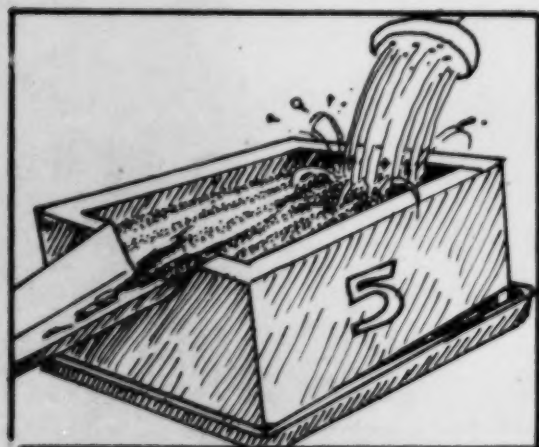
STEP 14 — One person in Group 5 will obtain a pencil for cultivation of the soil sample number 5.



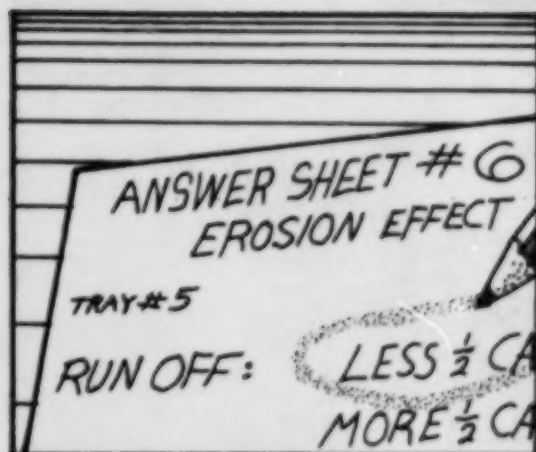
STEP 15 — Using the pencil tip, make horizontal (←→) furrows (small ditches used by farmers) across the tray one inch apart.



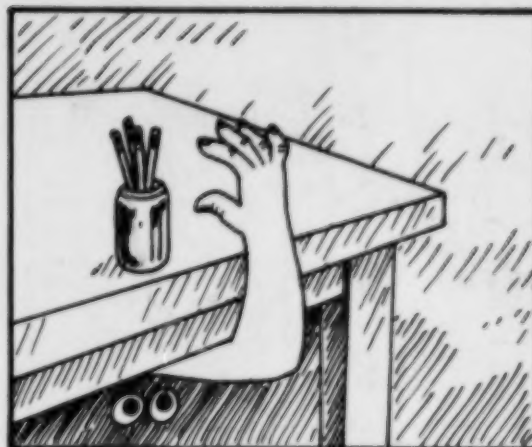
STEP 16 — Fill the water sprinkler.



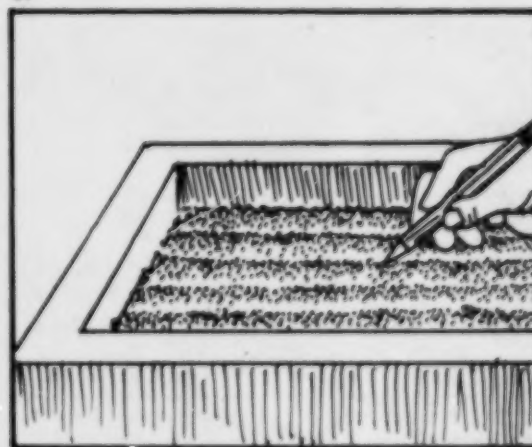
STEP 17 — Sprinkle all the water on soil sample number 5.



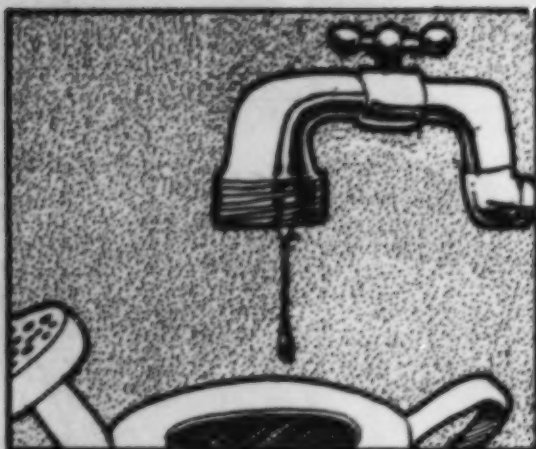
STEP 18 — Circle the results on your Answer Sheet. (Observe the condition of the furrows.)



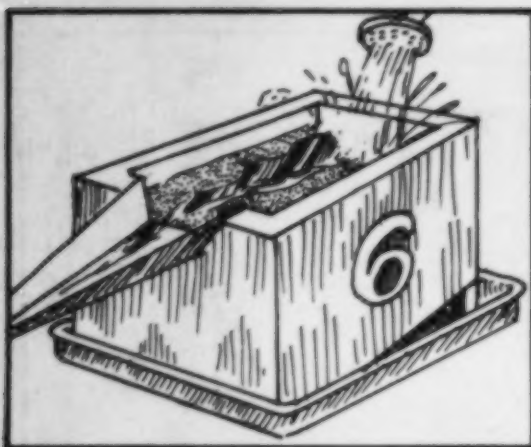
STEP 19 — One person in Group 6 will obtain a pencil for cultivation of soil sample number 6.



STEP 20 — Using the pencil tip, make vertical (↑) furrows approximately one inch apart.



STEP 21 — Refill the water sprinkler.



STEP 22 — Sprinkle all the water on soil sample number 6.



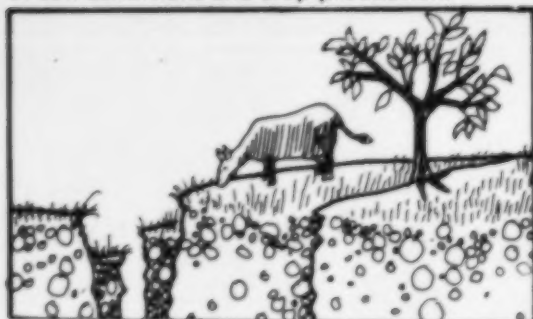
STEP 23 — Record the results on your Answer Sheet. (Observe the conditions of the furrows.)

Check Point

Have your instructor inspect your completed Answer Sheet.

Instructional Objective VII

Each student will discuss the importance of soil conditions and crop production.



STEP 1 – Erosion reduces crop production and can cost farmers large amounts of money.



STEP 2 – List any areas in or around your community where erosion has taken place.



STEP 3 – Make a list of these areas and, with your instructor's supervision, discuss these problems and possible solutions.

Check Point

Turn in all written work to your instructor.

OCCUPATIONAL DESCRIPTIONS

029.261-010 LABORATORY TESTER (any ind.)

Performs laboratory tests according to prescribed standards to determine chemical and physical characteristics or composition of solid, liquid, or gaseous materials and substances for purposes such as quality control, process control, product development, or determining conformity to specifications: Sets up, adjusts and operates laboratory equipment and instrumentation, such as microscopes, centrifuge, agitators, viscosimeter, chemical balance scales, spectrophotometer, colorimeter, and other equipment. Tests liquids and materials used as ingredients in adhesives, cement, propellants, lubricants, refractories, synthetic rubber, plastics, paint, paper, cloth, and other products for such qualities as purity, stability, viscosity, density, absorption, burning rate, and melting or flash point. Tests solutions used in processes, such as anodizing, waterproofing, cleaning, bleaching, and pickling, for chemical strength, specific gravity, or other specification. Tests materials for presence and content of elements or substances, such as hydrocarbons, manganese, natural grease, tungsten, sulfur, cyanide, ash, or dust, or other impurities. Tests samples of manufactured products to verify conformity to specifications. Records test results on standardized forms and writes test reports describing procedures used. May prepare graphs and charts. Cleans and sterilizes laboratory equipment. May prepare chemical solutions according to standard formulas. May add chemicals or raw materials to process solutions or product batches to correct deviations from specifications. May be designated according to product tested as CEMENT TESTER (cement); GAS TESTER (chem.; light, heat, & power; pipe lines); PAINT-AND-VARNISH TECHNICIAN (paint & varn.); SOILS TESTER (profess. & kin.); TESTER, AMMONIA SHIPPING (comp. & liquified gases). For testing of food products see FOOD TESTER (any ind.).

096.127-010 COUNTY-AGRICULTURAL AGENT (gov. ser.) agricultural agent; county adviser; county agent; extension agent; extension-service agent; extension worker; farm adviser; farm agent.

Organizes and conducts cooperative extension program to advise and instruct farmers and individuals engaged in agri-business in applications of agricultural research findings; Collects, analyzes, and evaluates agricultural data; plans and develops techniques; and advises farmers to assist in solving problems, such as crop rotation and soil erosion. Delivers lectures and prepares articles concerning subjects, such as farm management and soil conservation. Demonstrates practical procedures used in solving agricultural problems. Discusses extension program with representatives of commercial organizations, county government, and other groups to inform them of program services and to obtain their cooperation in encouraging use of services. Prepares activity, planning, and other reports and maintains program records. Prepares budget requests, or assists in their preparation. May supervise and coordinate activities of other county extension workers. May direct 4-H Club activities. May be designated by specific program assignment as AGRI-BUSINESS AGENT (gov. ser.); FARM-MANAGEMENT AGENT (gov. ser.); HORTICULTURAL AGENT (gov. ser.); LIVESTOCK AGENT (gov. ser.); RESOURCE AGENT (gov. ser.).

096.127-014 EXTENSION SERVICE SPECIALIST (gov. ser.) cooperative extension advisor specialist.

Instructs extension workers and develops specialized service activities in area of agriculture or home economics; Plans, develops, organizes, and evaluates training programs in subjects, such as home management, horticulture, and consumer information. Prepares leaflets, pamphlets, and other material for use as training aids. Conducts classes to train extension workers in specialized fields and in teaching techniques. Delivers lectures to commercial and community organizations and over radio and television to promote development of agricultural or domestic skills. Analyzes research data and plans activities to coordinate services with those offered by other departments, agencies, and

organizations. May be designated according to field of specialization as AGRICULTURAL-EXTENSION SPECIALIST (gov. ser.); HOME ECONOMICS SPECIALIST (gov. ser.).